Cefas contract report: - SLEA2

Oil and Gas Fisheries Risk Assessment Advice

Updated Cefas Recommendations for Spawning Finfish – English & Welsh Blocks

Author: Max La Vedrine

Issue date: 15/01/2014

Cefas Document Control

Title: Oil and Gas Fisheries Risk Assessment Advice

Submitted to:	Department of Energy and Climate Change (DECC)
Date submitted:	29/11/2013
Project Manager:	Max La Vedrine
Report compiled by:	Max La Vedrine
Quality control by:	Mark Kirby
Approved by & date:	Mark Kirby (29/11/2013)
Version:	1.3

Version Control History			
Author	**Date**	**Comment**	**Version**
Max La Vedrine	19/05/2012	Initial draft	1
Max La Vedrine	27/11/2013	Minor updates to blocks containing recommended restrictions. Further information provided. Sandeel recommendations to be considered.	1.1
Max La Vedrine	29/11/2013	Spawning map added. Document quality controlled and approved.	1.2
Max La Vedrine	15/01/2014	Updates made to the text based on comments from DECC.	1.3

Oil and Gas Fisheries Risk Assessment Advice

Updated Cefas Recommendations for Spawning Finfish – English & Welsh Blocks

Author: Max La Vedrine

Issue date: 15/01/2014

Head office

Centre for Environment, Fisheries & Aquaculture Science

Pakefield Road, Lowestoft, Suffolk NR33 0HT, UK

Tel +44 (0) 1502 56 2244 Fax +44 (0) 1502 51 3865

www.cefas.defra.gov.uk

Cefas is an executive agency of Defra

Executive Summary

1.1. Due to more recent data becoming available the Cefas seismic and drilling recommendations for spawning finfish in English and Welsh blocks have been updated.

1.2. Where updated data is not available pervious information will continue to be used until more up to date information is available.

1.3. Spawning recommendations for sandeels will be considered.

1 Introduction

Applications to carry out operations in the English & Welsh marine environment by the oil and gas industry are forwarded to the Cefas Oil and Gas Consultation inbox (ogc@cefas.co.uk) by the Department of Energy and Climate Change (DECC). Cefas comments on the proposals will include whether or not the proposed location and duration of operations is in an area where there are recommendations in place to protect spawning species. As part of another contract Cefas (ocns.ra@cefas.co.uk) provide chemical risk assessment advice to DECC relating to the use and/or discharge of any chemicals used in offshore oil and gas operations in English & Welsh waters. Applications regarding operations in Scottish waters are sent to Marine Scotland.

The main types of applications received from DECC are:

- Petroleum Operation Notifications (PON) which include:
  - PON4 (Portal WONS application sent by the Well Consents Team): is an application for consent to drill exploration, appraisal and development wells.
  - PON14A (now Portal application for Survey Consent): is an application to undertake an oil and gas survey which might be seismic (2D, 3D, 4D), magnetic, shallow drilling etc.
  - PON15B (now Portal application for Drilling Operations): seeks dispensation from preparing an environmental statement (ES) for a proposed well, and requests a chemical permit for the proposed operations.
  - PON15C (now Portal application for Pipeline Operations): seeks dispensation from preparing an ES for proposed pipeline works, and requests a chemical permit for the proposed operations.
  - PON15D (now Portal application for Production Operations): seeks dispensation from preparing an ES for proposed development / production operations (or for variations including renewal or extension of a production consent), and requests a chemical for the proposed operations.
  - PON15F (now Portal application for Well Intervention Operations): requests a chemical permit for proposed workover / well intervention operations.
  - PON16: accompanies the ES in support of the applications for field developments, drilling of wells or installation of pipelines.
- Marine and Coastal Act Application (now a Portal application): requests a licence for decommissioning operations or for other operations not covered by the above that may include disturbing the sea bed, the making of temporary or permanent deposits, the removal of substances or objects and the use of explosives.
- Pipeline Works Authorisation (PWA): is similar to an ES but for the installation of a pipeline or system of pipelines.
- Deposit Consent (DepCon): is an application to deposit materials such as rocks and concrete mattresses on the seabed to stabilise platforms or cover pipes that cannot be trenched.

The Portal Environmental Tracking System ('PETS') is DECC's new environmental permitting system accessed via the UK Oil Portal and has recently gone live. The system has been developed to streamline the current processes seeking approval under current environmental legislation covering

a wide range of offshore activities. The new PETS system seeks to integrate a range of applications under one centralised Master Application Template ('MAT') which will be applied for under the following activity headings:

- Drilling Operation;
- Well Intervention Operation;
- Pipeline Operation;
- Production Operation;
- Decommissioning Operation; and
- Standalone Application.

In addition to providing advice to DECC, Cefas will also provide scoping and screening advice to the applicant (normally through the consultant) for surveys and other operations that need an environmental assessment.

2 Cefas Seismic and Drilling Recommendations

2.1 Introduction to Cefas seismic and drilling recommendations

To advise DECC in regards to where, when and what specific fisheries sensitivities could be impacted by proposed oil and gas operations, Cefas have historically used the Coull *et al.* (1998) Fisheries Sensitivity Maps in British Waters. This report aims to assist in the environmental impact assessment process, and has considered maps indicating the main spawning and nursery grounds of 14 commercially important species; herring (*Clupea harengus*), cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangus*), saithe (*Pollachius virens*), Norway pout (*Trisopterus esmarki*), blue whiting (*Micromesistius poutassou*), mackerel (*Scomber scombrus*), sprat (*Sprattus sprattus*), sandeels (Ammodytidae), plaice (*Pleuronectes platessa*), lemon sole (*Microstomus kitt*), sole (*Solea solea*) and Norway lobster (*Nephrops norvegicus*). The areas of the maps which suggested spawning potential of cod, plaice, sole, whiting and herring were used to create Cefas recommendations in relation to potential restrictions on seismic and drilling activity. The duration of these potential restrictions is based on the known spawning periods (in particular peak spawning) of these fish.

Cefas seismic restriction recommendations apply to cod, plaice, sole, whiting and herring as it has been documented that adult fish can exhibit behavioural responses in response to seismic activity. If fish are migrating to spawning grounds or are exposed to seismic activity during spawning this could therefore have an impact on the fish's spawning success. Drilling related recommendations currently only apply to herring, as herring require suitable stable sediments will a low proportion of fine material which might be smothered by discharges during drilling operations.

Since these maps were produced there have been further ichthyoplankton surveys that have generated new relevant information. In 2012 Ellis *et al.* produced a report entitled 'The spawning and nursery grounds of selected fish species in UK waters'. The report enabled the update of some of these maps with more recent data. Such data is not available for all fish species, and many coastal, continental shelf, and shelf edge waters are still to be surveyed for ichthyoplankton and juveniles. However the majority of offshore oil and gas drilling activity and fields that have been discovered are located >15 km offshore in areas where recent ichthyoplankton surveys have been conducted. It has therefore been decided that the current Cefas recommended restrictions on seismic and drilling activity will be updated where applicable. The updated Cefas oil and gas fisheries recommended restrictions for English and Welsh waters are shown in Table 1.

Table 1 Cefas oil and gas spawning finfish recommended restrictions in English and Welsh waters

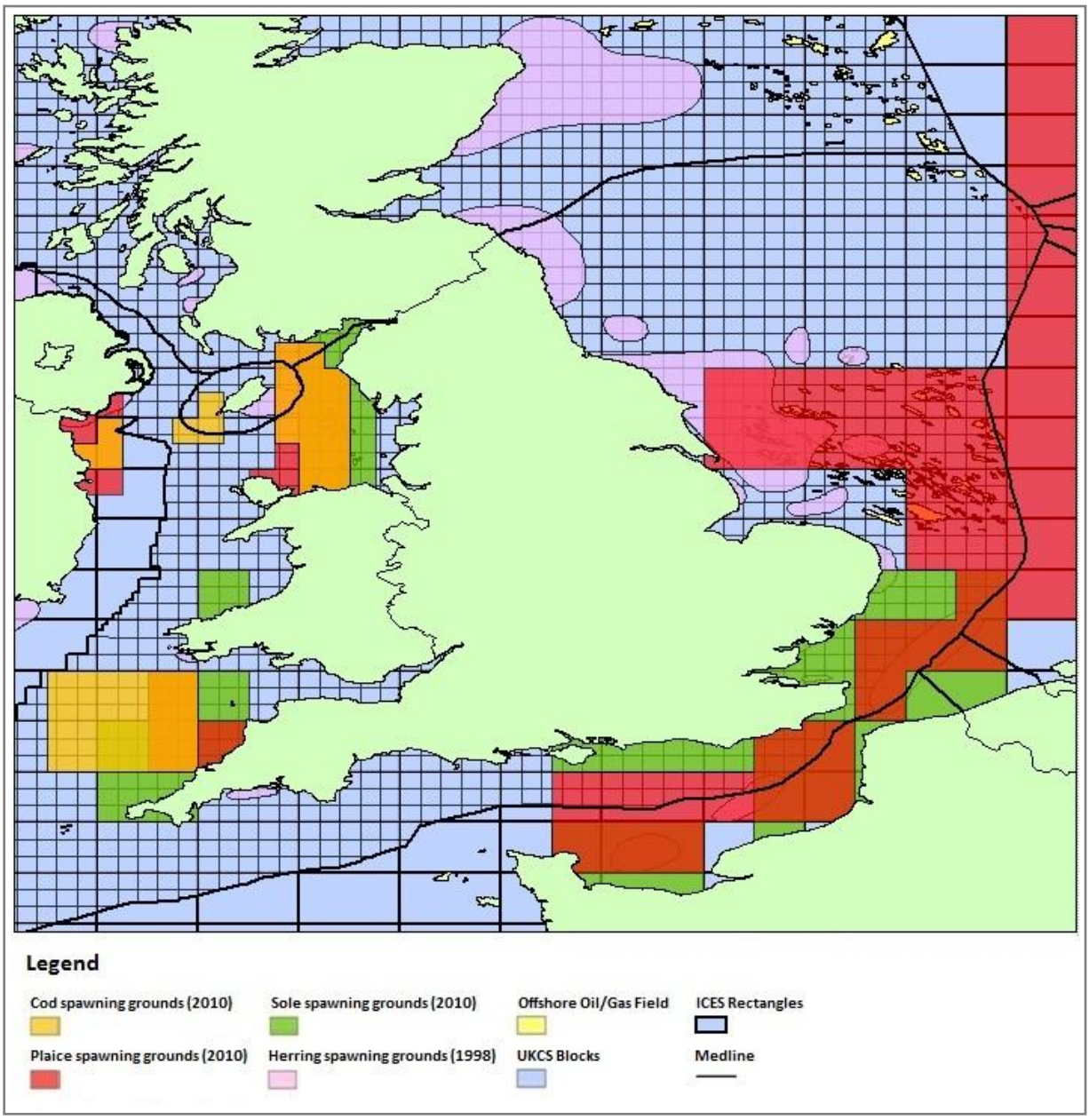
Quadrant	Blocks containing recommended restrictions on seismic activity to protect spawning demersal stocks (cod, plaice, sole, whiting)	Blocks containing recommended restrictions on drilling and seismic activity to protect spawning herring stocks
	January to March	**August to September**
26	-	28
27	-	-
28	-	-
29	-	-
30	-	-
31	21, 26, 27	-
32	-	-
		August to October
33	-	10
34	-	1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 20, 23, 24, 25, 28, 29
35	-	26, 27
36	-	-
37	-	-
38	-	-
39	1, 2, 6, 7, 11, 12, 16, 17, 21, 26	-
40	-	15
41	-	1, 2, 3, 6, 7, 8, 11, 12, 13, 14, 15, 17, 18, 19, 20, 23, 24, 25, 29, 30
42	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	5, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30
43	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	1, 6, 7, 8, 11, 12, 13, 14
44	16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30	-
45	1	-
46	-	5, 10
47	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 22, 23, 24, 25, 27, 30
48	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	1, 2, 6, 7, 8, 9, 10, 11 13, 14, 16, 21, 22, 23, 26, 27
49	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	-
50	16, 21, 26	-
51	-	-
	March to Mid-May	**November to January**
52	19, 20, 24, 25, 28, 29, 30	9, 10, 14, 15, 19, 20, 24, 25
	January to Mid-May	
53	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	27, 28, 29
54	1, 6, 11, 16	-
55	5, 9, 10, 13, 14, 15, 18, 19, 20, 30	5, 9, 10, 20

56	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30	6, 10, 15, 16, 17, 19, 20, 24, 25, 29, 30
57	1, 2, 3, 4, 6, 7, 8, 11, 12, 16, 21	1, 2, 3, 4, 6, 7, 8, 11, 12, 16, 21
58	1, 2, 3, 6, 7, 11	-
85	-	-
86	-	-
87	-	-
88	-	-
89	-	-
92	-	-
	January to March	
93	3, 4, 5, 8, 9, 10, 13, 14, 15	-
	January to Mid-May	
94	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	-
95	1, 2, 3, 6, 7, 8, 11, 12	18, 19, 22, 23, 24
96	-	-
97	-	-
98	3, 4, 5, 8, 9, 10, 13, 14, 15, 18, 19, 20, 23, 24, 25, 28, 29, 30	-
99	1, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29	-
100	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24	18, 19, 22, 23, 24
	January to March	
102	18, 19, 20, 23, 24, 25, 28, 29, 30	-
	January to Mid-May	
103	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	9, 10, 14, 15
104	16, 17, 18, 21, 22, 23, 26, 27, 28	-
105	-	-
106	-	-
	March to Mid-May	
107	16, 17, 18, 21, 22, 23, 26, 27, 28	-
	January to March	
108	1, 2, 4, 5, 9, 10	-
109	1, 2, 4, 5, 6, 7, 9, 10, 14, 15, 18, 19, 20, 24, 25	-
	January to Mid-May	
110	1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24	-
	January to March	**September to October**
111	21, 22, 26, 27	21, 22, 26, 27
	January to Mid-May	**August to September**
112	15, 20, 25, 29, 30	25, 30
113	3, 4, 7, 8, 11, 12, 13, 16, 17, 18, 21, 22, 23, 24, 26, 27, 28, 29	21, 26
125	-	18, 23, 24

2.2 GIS Data layers

Maps displaying which blocks are covered by Cefas recommendations relating to fisheries spawning restrictions can be reproduced using the GIS data layers available on the Cefas website (http://www.cefas.defra.gov.uk/our-science/fisheries-information/ecologically-important-fish-habitats/distribution-of-spawning-and-nursery-grounds.aspx). An example of this can be seen in figure 1.

Figure 1 Cefas oil and gas fisheries spawning recommendations



2.3 Recommended restrictions on seismic activity to protect spawning demersal stocks

These updated restriction recommendations are in place to protect high intensity spawning areas for cod, plaice, sole and whiting. In the Ellis *et al.* (2012) report it was reported that ichthyoplankton surveys found cod eggs and larvae widespread throughout the North Sea indicating that spawning may be more widespread than indicated by Coull *et al.* (1998). Important high intensity spawning areas for cod are Trevose Head (north Cornwall) and in the eastern and western Irish Sea, these may also be slightly more widespread than previously suggested by Coull *et al.* (1998).

In the Ellis *et al.* (2012) report no high intensity spawning areas of whiting were identified, however whiting eggs and larvae were found in a variety of ichthyoplankton surveys indicating that low intensity spawning areas are found over a large area. Whiting spawn from February to May and it was identified that large areas of low intensity whiting spawning overlap with areas where there is high intensity spawning of at least one other species; cod, plaice or sole. As cod spawn from January to April (peak February and March), plaice December to April (peak January and February) and sole March to May (peak April) it was decided that large areas of low intensity whiting spawning areas would be protected by recommended restrictions for other species.

Important spawning grounds for plaice were identified in the southern North Sea, eastern English Channel, Trevose Head and eastern and western Irish Sea. Important spawning grounds for plaice were also identified in shallow waters of the eastern Irish Sea, Cardigan Bay, eastern English Channel and the Greater Thames Estuary.

2.4 Recommended restrictions on drilling and seismic activity to protect spawning herring stocks

In the absence of updated herring spawning maps and GIS data layers it has been decided that the previous Coull *et al.* (1998) herring spawning information will continue to be used until updated information becomes available. Herring spawn at different times of the year depending on the spawning location, in the English part of the North Sea this is largely August to October, and in the eastern Irish Sea this is August to September and in the English Chanel this is November to January.

2.5 Recommended restrictions on drilling activity to protect spawning sandeels

Recommended restrictions on drilling activity to protect high intensity spawning areas of sandeels may be considered in the future. Like herring, sandeel eggs are deposited on the seabed. Sandeel larvae usually hatch from February to March. Sandeels mature and are ready to reproduce between one and three years old. Sandeels are known to be eaten by a number of commercially important fish and they are also eaten by other animals including birds and seals.

Because sandeel eggs are deposited on the seabed they are sensitive to smothering impacts. The smothering of eggs in a high intensity spawning area could potentially impact an entire year class in

the locality of the drilling operations. The smothering of sandeel eggs can also have knock-on effects for other fish species and animals.

However sandeel spawning (high and low intensity) is widespread and potentially significant smothering impacts might only occur very close to the drill site and therefore may not pose a substantial risk to stocks in the wider context.

2.6 Occasions where a waiver for an operation to take place may be granted

Despite there being recommendations relating to seismic and drilling restrictions in place to protect fish there are occasions where guidance to DECC will indicate that the application for an operation to take place might be granted, these include the following examples:

- Where the duration of a seismic survey within a restriction period is short and the energy source volume is very low; e.g. a 1 week 2D seismic survey with an energy volume of 160 cubic inches.
- Where a Herring Spawning Ground Survey (HSGS) indicates that there is no, or limited, herring spawning potential in an area.
- Based on a case by case basis using expert scientific judgement.

3 Summary

The updated Cefas recommended operational restrictions in relation to fisheries spawning areas are based on the 2012 Ellis *et al.* report alongside the associated GIS data layers. As the herring spawning grounds GIS data layer has not been updated it has been decided that the previous Coull *et al.* (1998) herring spawning information will continue to be used until updated information becomes available.

Key outcomes of the 2012 Ellis *et al.* report included observations of spawning in the North Sea and other areas indicating that spawning may be more widespread than previously thought for some species and that some species may be spawning intensively in areas larger than previous understood. The outcome of this is that some blocks no longer contain fisheries restrictions and some blocks that did not previously contain restrictions now have them in place.

Recommend restrictions to protect sandeel spawning areas from being smothered by drilling operations will also be considered.

It is possible that an operation may take place during a recommend restriction period. Applications will be reviewed on a case by case basis and additional information may have to been obtained and provided to both DECC and Cefas.

4 References

Coull, K.A., Johnstone, R., and S.I. Rogers. 1998. Fisheries Sensitivity Maps in British Waters. Published and distributed by UKOOA Ltd.

Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. 2012. Spawning and nursery grounds of selected fish species in UK waters. Sci. Ser. Tech. Rep., Cefas Lowestoft, 147: 56 pp.

About us

Cefas is a multi-disciplinary scientific research and consultancy centre providing a comprehensive range of services in fisheries management, environmental monitoring and assessment, and aquaculture to a large number of clients worldwide.

We have more than 500 staff based in 2 laboratories, our own ocean-going research vessel, and over 100 years of fisheries experience.

We have a long and successful track record in delivering high-quality services to clients in a confidential and impartial manner.
(www.cefas.defra.gov.uk)

Cefas Technology Limited (CTL) is a wholly owned subsidiary of Cefas specialising in the application of Cefas technology to specific customer needs in a cost-effective and focussed manner.

CTL systems and services are developed by teams that are experienced in fisheries, environmental management and aquaculture, and in working closely with clients to ensure that their needs are fully met.
(www.cefastechnology.co.uk)

.

Customer focus

With our unique facilities and our breadth of expertise in environmental and fisheries management, we can rapidly put together a multi-disciplinary team of experienced specialists, fully supported by our comprehensive in-house resources.

Our existing customers are drawn from a broad spectrum with wide ranging interests. Clients include:

- international and UK government departments
- the European Commission
- the World Bank
- Food and Agriculture Organisation of the United Nations (FAO)
- oil, water, chemical, pharmaceutical, agro-chemical, aggregate and marine industries
- non-governmental and environmental organisations
- regulators and enforcement agencies
- local authorities and other public bodies

We also work successfully in partnership with other organisations, operate in international consortia and have several joint ventures commercialising our intellectual property

Head office
Centre for Environment, Fisheries & Aquaculture Science
Pakefield Road, Lowestoft,
Suffolk NR33 0HT UK

Tel +44 (0) 1502 56 2244
Fax +44 (0) 1502 51 3865

Web www.cefas.defra.gov.uk

Centre for Environment, Fisheries & Aquaculture Science
Barrack Road, The Nothe
Weymouth, DT4 8UB

Tel +44 (0) 1305 206600
Fax +44 (0) 1305 206601

printed on paper made from a minimum 75% de-inked post-consumer waste